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In re Patent Application of:  
**TOWNSEND ET AL.**  
Serial No. 10/582,817  
Filed: June 14, 2006

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REMARKS

Applicants would like to thank the Examiner for the thorough examination of the present application. Applicants would also like to thank the Examiner for correctly indicating as allowable the subject matter of dependent Claims 3 and 4.

Claim 8-18 have been cancelled based on the restriction requirement. The Applicants reserve the right to file a divisional application to the subject matter of these claims. The Abstract has been amended as helpfully suggested by the Examiner. In addition, dependent Claims 3 and 5 have been amended to address the minor informalities as also helpfully noted by the Examiner.

Independent Claim 1 has been amended to include the allowable subject matter from dependent Claim 3. The Applicants submit that Claims 1-7 are now in condition for allowance. Claim 3 has been cancelled, the remaining dependent claims have been amended for consistency.

In addition, new Claims 19-29 have been added. The new claims and arguments supporting their patentability are provided below. Attached for the Examiner's reference is Attachment A which is a portion of the Yamagushi et al. patent translated.

I. New Independent Claim 19

New independent Claim 19 is directed to an apparatus for pallet inspection and repair comprising an inspection station comprising at least one laser and at least one camera to

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collect light from the at least one laser after being reflected from a pallet comprising a number of elements to be inspected, and a computer configured to run analysis software that analyses the reflected light.

The analysis software is configured to performing the following: receiving from the at least one camera three-dimensional points, each point having an x-, a y-, and a z-coordinate; filtering the three-dimensional points to obtain a top surface geometry and topography by discarding points having a z-coordinate below a threshold; identifying a type and number of each element based on the top surface geometry and topography; determining a pallet design from the type and number of each element; comparing each element of the pallet to a database to generate a list of repairs; and generating a repair recipe from the list of repairs.

## II. Independent Claim 19 Is Patentable

Since new independent Claim 19 is similar to original independent Claim 1 and a portion of the subject matter from dependent Claim 3, the following prior art references will be discussed: the Petruzzi patent (WO 99/04926) in view of the Yamagushi et al. patent (JP 09159433) and in further view of the Buckley et al. patent (US 6,064,759).

Petruzzi is directed to an automated machine for repairing defects located on a handling pallet. As correctly noted by the Examiner, Petruzzi fails to disclose that the

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automated machine has a laser and camera, and is connected to a computer with analysis software running on the computer.

The Examiner cited Yamagushi et al. as disclosing a pallet inspection station with computer software that analyzes imaging signals corresponding to inspected regions of a pallet. As correctly noted by the Examiner, Yamagushi et al. fails to disclose that the imaging signals are generated based on using a laser and camera. The Examiner cited Buckley et al. as disclosing this feature. Buckley et al. is directed to a computer aided inspection machine that uses a laser and camera in conjunction with computer analysis software.

The Applicants submit that even if the references were selectively combined as suggested by the Examiner, the claimed invention is still not produced. The Applicants submit that the prior art references fail to disclose run analysis software configured to performing the following: filtering three-dimensional points to obtain a top surface geometry and topography by discarding points having a z-coordinate below a threshold, identifying a type and number of each element based on the top surface geometry and topography, determining a pallet design from the type and number of each element, and comparing each element of the pallet to a database to generate a list of repairs.

As correctly noted by the Examiner, Petruzzi fails to disclose analysis software running on a computer for pallet inspection and repair. In Yamagushi et al., the Examiner

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referenced as disclosing a pallet inspection station with computer software that analyzes imaging signals corresponding to inspected regions of a pallet. As correctly noted by the Examiner, Yamagushi et al. discloses the use of a computer to determine cracks in a pallet. Translated paragraphs 208 to 218 directed to crack determination in Yamagushi et al. is provided in Attachment A. Attachment A states that image processing is performed using the 1<sup>st</sup> through 4<sup>th</sup> cameras to determine cracks and/or missing boards in the pallet. Paragraph 216 states that color detection areas are created, and the areas are classified into white dots and black dots. Based on the ratio of white and black dots, a determination can be made if a board is cracked and/or missing.

In Buckley et al., the automatic inspection method and apparatus uses structured light and machine vision cameras to inspect an object in conjunction with the geometric model of the object. Camera images of the object are analyzed by computer to produce the location of points on the object's surfaces in three dimensions. During a setup phase before object inspection, the points are analyzed with respect to the geometric model computer file of the object. The inspection device uses several multiplexed sensors, each composed of a camera and a structured light source, to measure all sides of the object on a single pass. In particular, reference is directed to column 2, lines 51-65 of Buckley et al., which provides:

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A first aspect of the present invention is to provide a method of analyzing a generalized object to determine its dimensions during inspection based upon its geometric model computer file. The process has three steps: 1) analyze the object's geometric model and determine by simulation which surface or edge points are required for inspection, 2) direct this information to the inspection machine that will extract the 3-space coordinates of the required points from a similar physical object and 3) calculate the dimensions of that object using the measured points combined with the simulation analysis. The analysis of the geometric model can be simplified by identifying surfaces of the object as belonging to a set of primitive components common to manufactured parts such as planes, cylinders, conic sections, spheres, helixes and splined surfaces. (Emphasis added).

The Applicants submit that Buckley et al. fails to filter three-dimensional points to obtain a top surface geometry and topography by discarding points having a z-coordinate below a threshold, identifying a type and number of each object being inspected based on the top surface geometry and topography, determining a design of the object being inspected from the type and number of each element, and comparing each element of the object being inspected to a database to generate a list of repairs. Instead, Buckley et al. relies on comparison of the 3-D data to a simulation of the object stored in a database.

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Accordingly, it is submitted that new independent Claim 19 is patentable over Petruzzi in view of Yamagushi et al. and in further view of Buckley et al.

In view of the patentability of new independent Claim 19, it is submitted that the dependent claims, which include yet further distinguishing features of the invention are also patentable. These dependent claims need no further discussion herein.

### III. CONCLUSION

In view of the amendments to the claims and the arguments provided herein with respect to the new claims, it is submitted that all the claims are patentable. Accordingly, a Notice of Allowance is requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,



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